Researchers realize high-level biosynthesis of sesquiterpenoid β-elemene in yeast

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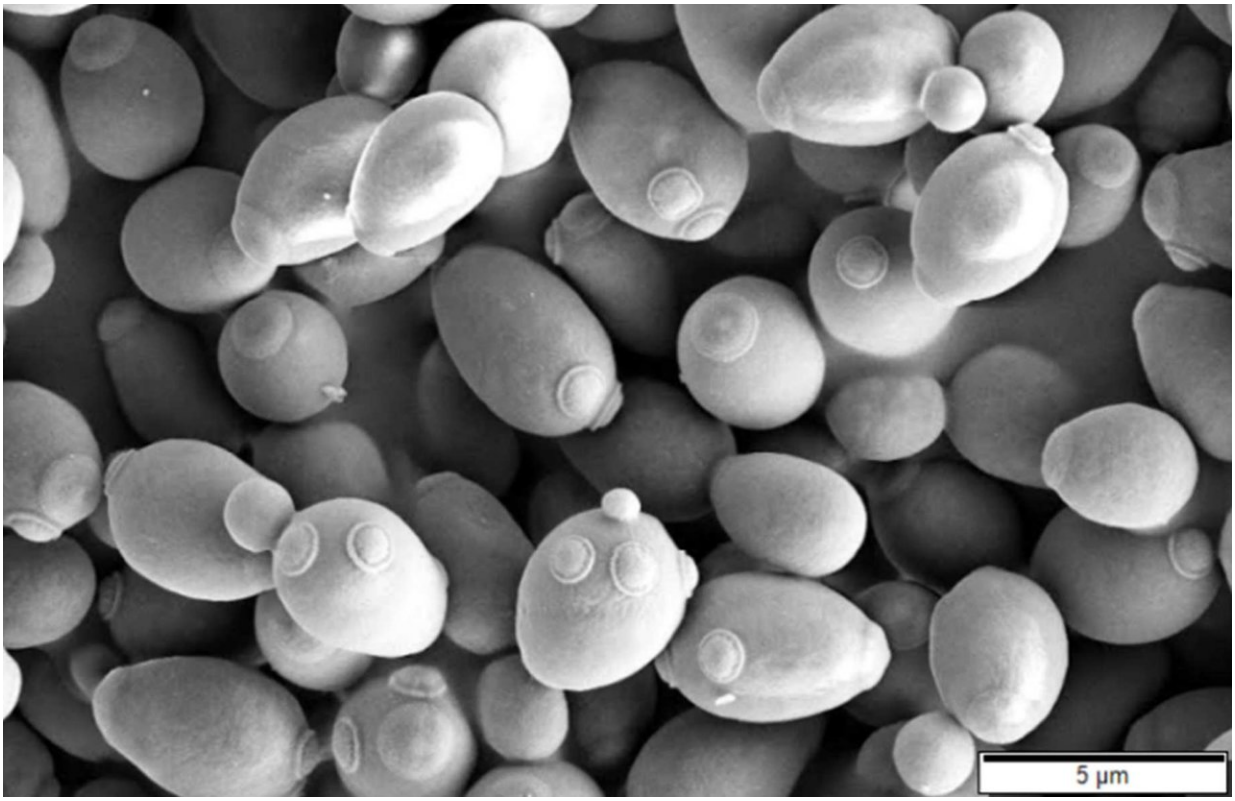

Saccharomyces cerevisiae, SEM image. Credit: Mogana Das Murtey and Patchamuthu Ramasamy/CC BY-SA 3.0

β-elemene, a sesquiterpenoid from the traditional Chinese herb Rhizoma zedoariae, has been widely applied in cancer therapies. Currently, β-elemene is mainly extracted from the plant, which cannot meet market

demand.

Microbial cell factories may provide a feasible route for sustainable production of β-elemene toward industrial applications.

Recently, a research group led by Prof. Zhou Yongjin from the Dalian Institute of Chemical Physics (DICP) of the Chinese Academy of Sciences (CAS) established a sesquiterpenoid platform by extensively rewiring the nonconventional yeast Ogataea polymorpha for β-elemene production.

This study was published in *Metabolic Engineering*.

O. polymorpha featured with high-density fermentation and thermal tolerance is a nonconventional Crabtree-negative microorganism, which is beneficial for constructing superior cell factories.

In this study, the researchers achieved global metabolic rewiring of Ogataea polymorpha by optimizing the mevalonate (MVA) pathway and enhancing the supply of acetyl-CoA and cofactor nicotinamide adenine dinucleotide phosphate hydrogen (NADPH). They obtained the highest titers of 4.7 g/L in fed-batch fermentations in shake-flask.

"This work proved the potential of Ogataea polymorpha as a chassis cell for production of sesquiterpenoids and other acetyl-CoA derived chemicals, which might contribute to the large-scale production of β-elemene in industries," said Prof. Zhou.

More information: Min Ye et al, Global metabolic rewiring of the nonconventional yeast Ogataea polymorpha for biosynthesis of the sesquiterpenoid β-elemene, *Metabolic Engineering* (2023). DOI: 10.1016/j.ymben.2023.02.008

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